

# Technical Memorandum

November 18, 2021

Project# 269210.000

To: Keith Belden, PE (Morrison Maierle)  
From: Andy Daleiden, PE;  
Tara Hofferth, PE; Md Sakoat Hossan, PhD, PE, PTOE  
RE: Ridge Run Baseball Stadium –  
Proposed Scope of Work for the Transportation Impact Study (TIS)



This memorandum documents the TIS scope and assumptions for the proposed Ridge Run Baseball Stadium located near McDermott Lane and US 93 in Flathead County, Montana. This memorandum was developed based on conversations with the project team, our familiarity with the area, and our understanding of Montana Department of Transportation (MDT) and Flathead County policies.

This memorandum addresses the following items:

- Project description
- Estimated trip generation and distribution
- Analysis scenarios and study assumptions
- Analysis tools

## PROJECT DESCRIPTION

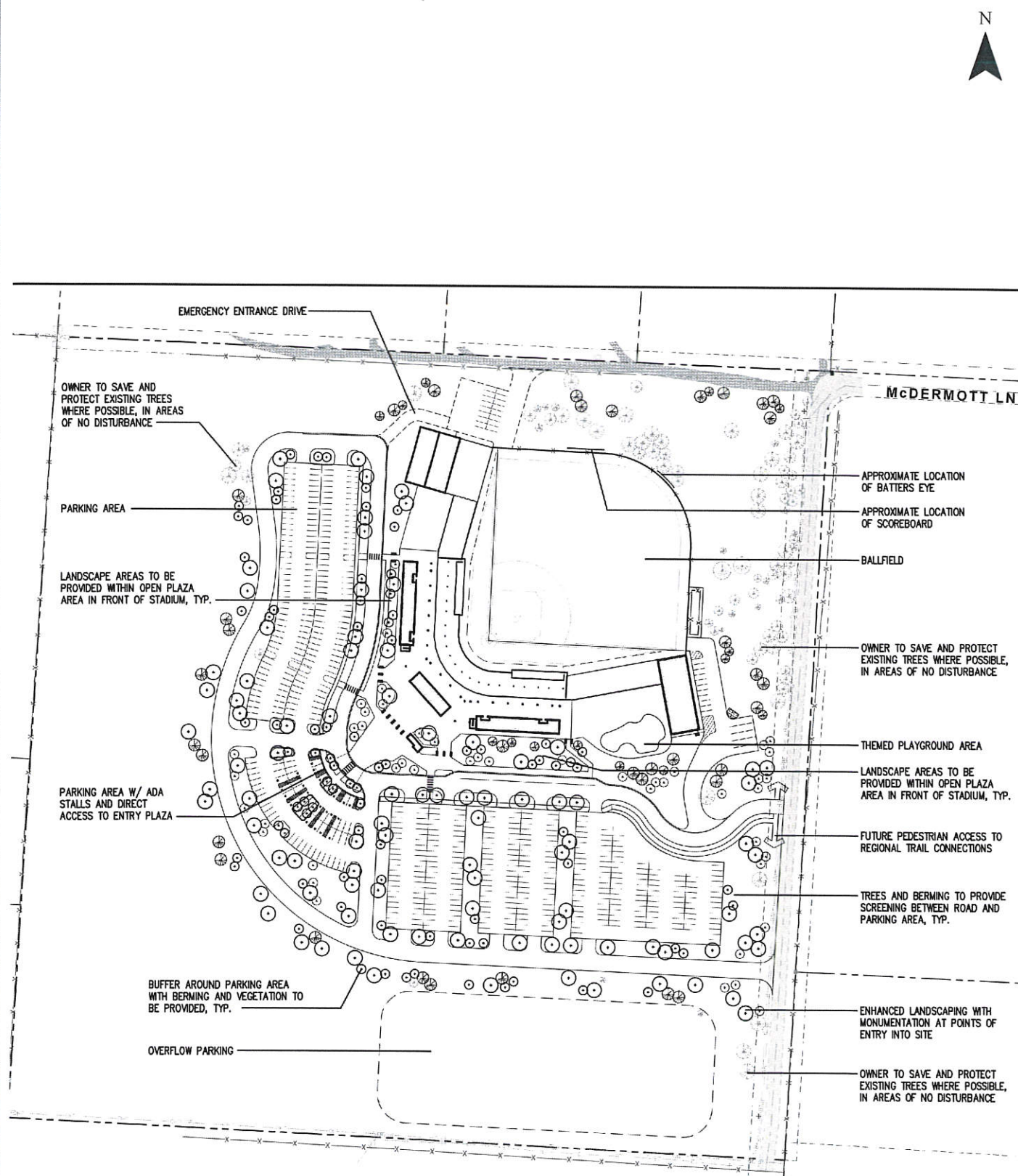
The project is located on the west side of US 93 in Flathead County, Montana. It is about 14 miles south of central Whitefish, MT and 7 miles north of central Kalispell, MT. The property is currently accessible via McDermott Lane, which intersects with US 93 about a mile north of the Church Street / US 93 interchange. Figure 1 shows the site vicinity and project boundaries. The proposed site is currently vacant land. The proposed development plan, shown in Figure 2, consists of two phases:

### Phase 1 – Baseball Stadium

- Build a minor league baseball stadium with approximately 3,545 seats and a parking lot with approximately 571 parking spaces in addition to an overflow parking lot.
- Access the site via a new roadway that connects with McDermott Lane, located approximately 775 feet from US 93.
- Build-out year is 2022.

### Phase 2 – Other Development Uses

- Develop the 40-acres of property adjacent to the minor league baseball stadium for residential and commercial uses (the specific land use and size will be determined for the TIS.)
- Access the site via one or two new roadways (still to be determined): 1) new east-west roadway that connects as the west leg of the Schrade Road/US 93 intersection, and 2) new north-south roadway the connects with Church Street.
- Build-out year is 2024.

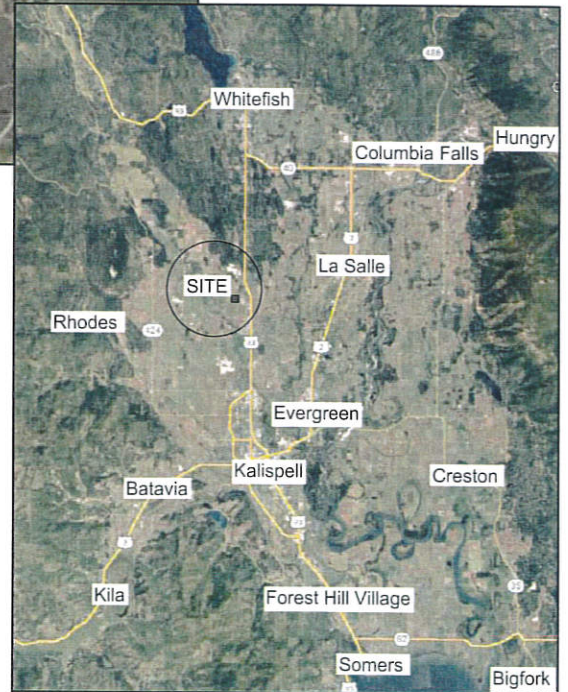
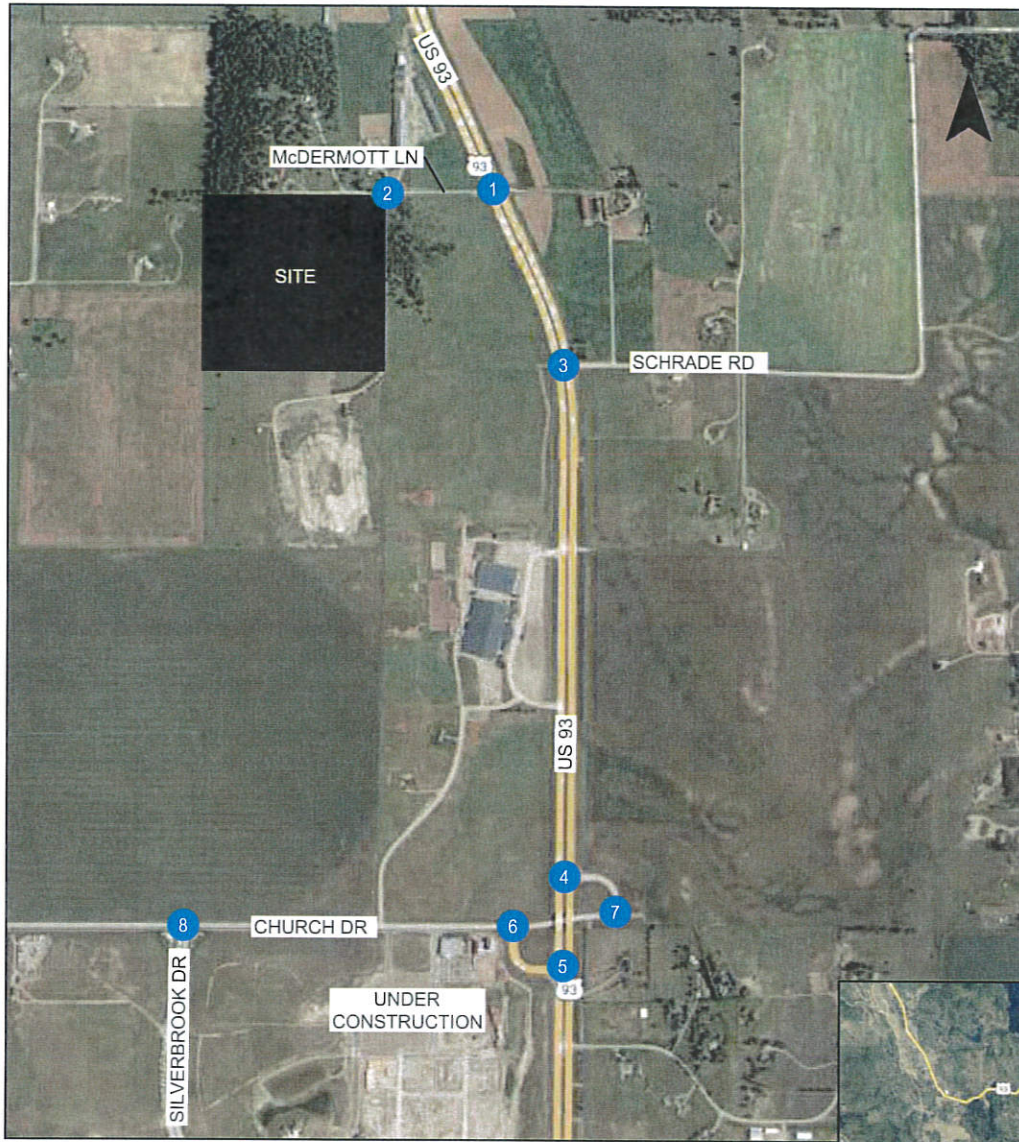


Site plan provided by  
Morrison-Maierle on  
November 16, 2021

## Preliminary Site Plan Flathead County, Montana

Figure  
2





## - Study Intersections

**Site Vicinity Map  
Flathead County, Montana**

**Figure  
1**

H:\20126921 - Ridge Run Baseball Stadium TIS\report\fig1\26921\_Ridge Run Baseball Stadium Figures.dwg Nov 18, 2021 - 7:57am - thoffert Layout Tab: Fig 01- Study Area



## TRIP GENERATION

### Phase 1 – Baseball Stadium

Kittelson & Associates, Inc. reviewed several trip generation studies, trip generation methodologies from past projects, and the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11<sup>th</sup> Edition (Reference 1) to estimate weekday PM and Saturday peak hour trips for the proposed minor league baseball stadium. Overall, there are limited studies on trip generation for minor league baseball stadiums. The ITE Trip Generation Manual, 11<sup>th</sup> Edition includes only two data points for professional baseball stadium (ITE Code 462).

In the Pioneer League, there are currently 8 teams of which stadium capacity varies from 3,001 seats (Great Falls Voyagers) to 8,500 seats (Rocky Mountain Vibes). Given the limited ITE trip generation data, Kittelson & Associates, Inc. estimated the trip generation for the proposed minor league baseball stadium based on average sold tickets and average occupancy from other similar stadium size (number of seats) located in similar area type (rural and market service area for population size) of minor league baseball teams. Table 1 summarizes the average sold tickets and average potential occupancy for such similar minor league baseball teams in the Pioneer League.

**Table 1: Average and Percent Sold Tickets (from other similar minor league baseball teams)**

Team	Capacity	Average Sold Tickets	% Sold
Billings Mustangs	3,071	2,473	80.5%
Idaho Falls Chukars	3,400	2,333	68.6%
Missoula Paddleheads	3,500	1,640	46.9%
Great Falls Voyagers	3,001	1,431	47.7%

The proposed minor league baseball stadium is planned to have approximately 3,545 seats. Additionally, the stadium will have 60 employees plus trips from the home and away team players and coaches. The home team typically has some carpooling between players and the away team arrives by bus. This study assumed 2.5 as the vehicle occupancy factor for the attendee traffic (Reference 2). At full capacity, there would be 3,545 attendees in addition to employees, players, and coach resulting in 1,442 vehicle trips  $[(3,545+60)/2.5]$ .

Using the data shown in Table 1, Kittelson assumed that the average ticket sales would be approximately 50% per game. Acknowledging that not all the sold tickets end up being present in the stadium (due to suites, sponsorships, season ticket holders, etc.), it was assumed that the average attendance percentage of the proposed stadium would be 45.0%. With this assumption, the average capacity is estimated at 1,655  $[(0.45*3,545)+60]$  attendees resulting in 662 vehicle trips.

Given the nature of the baseball event, traffic was assumed to follow a distribution pattern – both for arrival and departure. This study followed the hourly distribution of entering and exiting vehicle trips recommended by the ITE Trip Generation Manual, 11<sup>th</sup> Edition for professional baseball stadium (land use code – 462). The distribution was tailored to align with the game start time of the proposed baseball stadium, which is a start time of 07:00 PM. **Table 2** exhibits the 24-hour distribution assumption of entering and exiting trips, and associated number of entering and exiting vehicle under two conditions – at average capacity (662 vehicle) and at full capacity (1,442 vehicle).

**Table 2: Hourly Distribution of Entering and Exiting Vehicle Trips (Game Start at 07:00 PM)**

Time	% of 24-Hour Vehicle Trips			At Average Capacity = 662 Veh			At Full Capacity = 1,442 Veh		
	Total	Entering	Exiting	Total	Entering	Exiting	Total	Entering	Exiting
12:00 - 1:00 AM	0.0%	0.0%	0.0%	0	0	0	0	0	0
1:00 - 2:00 AM	0.0%	0.0%	0.0%	0	0	0	0	0	0
2:00 - 3:00 AM	0.0%	0.0%	0.0%	0	0	0	1	0	0
3:00 - 4:00 AM	0.1%	0.0%	0.0%	0	0	0	1	1	0
4:00 - 5:00 AM	0.1%	0.0%	0.0%	0	0	0	1	1	0
5:00 - 6:00 AM	0.1%	0.0%	0.0%	0	0	0	1	1	0
6:00 - 7:00 AM	0.1%	0.0%	0.0%	0	0	0	1	1	0
7:00 - 8:00 AM	0.1%	0.0%	0.0%	0	0	0	1	1	0
8:00 - 9:00 AM	0.1%	0.0%	0.0%	0	0	0	1	1	0
9:00 - 10:00 AM	0.1%	0.0%	0.0%	0	0	0	1	1	0
10:00 - 11:00 AM	0.2%	0.2%	0.1%	2	1	1	3	2	1
11:00 - 12:00 PM	1.0%	0.7%	0.3%	6	4	2	14	10	4
12:00 - 1:00 PM	2.2%	1.7%	0.5%	14	11	3	32	25	7
1:00 - 2:00 PM	2.4%	1.6%	0.8%	15	10	5	34	22	12
2:00 - 3:00 PM	4.2%	3.2%	1.0%	28	21	7	61	46	15
3:00 - 4:00 PM	9.3%	6.8%	2.5%	62	45	17	134	98	36
4:00 - 5:00 PM	13.8%	11.5%	2.2%	91	76	15	198	166	32
5:00 - 6:00 PM	30.0%	27.1%	2.9%	198	179	19	433	391	42
6:00 - 7:00 PM	31.2%	28.6%	2.6%	207	190	17	452	414	38
7:00 - 8:00 PM	16.3%	11.7%	4.6%	108	78	30	235	169	66
8:00 - 9:00 PM	8.0%	1.5%	6.5%	53	10	43	116	22	94
9:00 - 10:00 PM	8.8%	0.4%	8.4%	58	2	56	127	5	122
10:00 - 11:00 PM	39.6%	1.3%	38.2%	262	9	253	570	19	551
11:00 - 12:00 AM	32.4%	3.3%	29.1%	215	22	193	467	47	420
Total		100.0%	100.0%						

## Phase 2 – Other Development Uses

Kittelson will estimate the projected weekday daily, AM peak hour, and PM peak hour vehicle trips for the adjacent land uses based on the *ITE Trip Generation Manual, 11<sup>th</sup> Edition* (Reference 1). Pass-by rates will be based on data presented in the *ITE Trip Generation Handbook, 3<sup>rd</sup> Edition* (Reference 3). If applicable, internal capture rates will be determined by using the *NCHRP Report 684: Enhancing Internal Trip Capture Estimation for Mixed-Use Developments*. The adjacent land uses are unknown at this time. Kittelson will develop the trip generation estimate for the TIS as more information is gathered for this portion of the project from the project team.

# TRIP DISTRIBUTION

## Phase 1 – Baseball Stadium

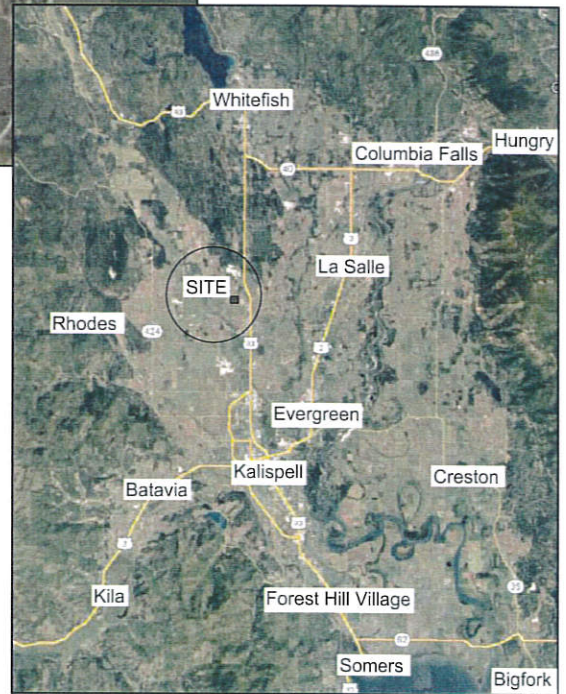
The distribution of the proposed baseball stadium site generated trips onto the roadway system was based on review of the roadway system and knowledge of travel patterns in the study area. Figure 3 shows the estimated trip distribution pattern.



The assumptions made in Figure 3 account for the populations of the surrounding municipalities. The communities of Whitefish, Columbia Falls, Coram, West Glacier, and Olney have a population of about 13,000 people and are located north of the proposed baseball stadium. The communities of Kalispell, Evergreen, Batavia, Kila, Forrest Hill Village, Somers, and Bigfork have a population of about 32,000 people, with Kalispell being particularly more populous than surrounding towns. These municipalities are located south of the proposed baseball stadium. As such, Kittelson assumed about 30% of traffic will come from/toward the north and 70% will come from/to the south. The street grid east and west is more rural and disconnected. It is assumed that most attendees will utilize US 93 from the north and south to access the proposed baseball stadium. Therefore, only a small percentage is assumed to use the east and west routes.

## Phase 2 – Other Development Uses

Kittelson will distribute the site generated trips for the adjacent land uses based on the following information: review of the regional travel demand model, review of the roadway system, review of turning movement counts and link volumes in the study area, and knowledge of travel patterns in the study area.



## - Study Intersections

Estimated Trip Distribution  
Flathead County, Montana

Figure  
3



## ANALYSIS SCENARIOS & STUDY ASSUMPTIONS

The proposed TIS assumptions for the analysis include:

### Study Phases

- Existing Traffic Conditions (Year 2021)
  - Analyze traffic conditions for a baseball game during the weekday PM (inbound peak hour and outbound peak hour) and Saturday (inbound peak hour and outbound peak hour) time periods
- Phase 1 Buildout (Year 2022), full buildout of baseball stadium, access via McDermott Lane
  - Analyze traffic conditions for a baseball game during the weekday PM (inbound peak hour and outbound peak hour) and Saturday (inbound peak hour and outbound peak hour) time periods
- Phase 2 Buildout (Year 2024), full buildout of baseball stadium and other development uses (retail and residential), access via McDermott Lane, Schrade Road, and Church Drive
  - Analyze traffic conditions for the other development uses during the weekday PM peak hour
  - Analyze traffic conditions for a baseball game and other development uses during the weekday PM (inbound peak hour and outbound peak hour) and Saturday (inbound peak hour and outbound peak hour) time periods

For Phases 1 and 2, total traffic conditions will be evaluated, including background traffic volumes plus site-generated trips from the proposed development. Given the build-out years are relatively soon and minimal in-process development traffic, Kittelson proposes to not include a separate analysis scenario for background conditions.

### Data Collection

Turning movement counts will be collected during a typical weekday evening from 4 PM to 11 PM and Saturday from 4 PM to 11 PM at the study intersections.

These peak hours are selected based on the anticipated timing of events. The Pioneer League typically plays on weeknights and on weekends. Weeknight games include Monday, Wednesday, Thursday, Friday and typically start between 6:30-7:15 PM. Saturday games typically start between 5:00-7:15 PM and Sunday games typically start between 1:00-5:00 PM. Minor League baseball games typically last about 3 hours.

Kittelson will request crash data (most recent 5-years) at the study intersections and roadway segments from MDT.

### Study Intersections

1. McDermott Lane & US 93 (stop control)
2. McDermott Lane & new North-South Access Road (stop control)
3. Schrade Road & US 93 (stop control)
4. US 93 NB On-Off Ramp @ Church Drive (stop control)
5. US 93 SB On-Off Ramp @ Church Drive (stop control)
6. US 93 West Ramp & Church Drive (stop control)
7. US 93 East Ramp & Church Drive (stop control)



8. Church Drive & Silverbrook Drive (stop control)
9. Access points off new North-South Access Road (stop control)

## Background Growth Rate and In-Process Developments:

- A growth rate of 4% is assumed. This was calculated using annual growth and historic traffic count data from MDT along US 93. This assumption aligns with growth rates developed for the Kalispell Area Move 2040 Transportation Plan (2021) (Reference 4), which assumes a 2.5% household growth rate around Kalispell, a 2.3% household growth rate around Evergreen, and a 1.9% household growth rate for the rest of the study area. The 2040 Plan also assumes a 2.1% growth in jobs in Kalispell, a 1.2% growth in jobs in Evergreen, and a 2.3% growth in jobs in the rest of the area. The Existing plus Committed (E+C) Model for 2040 predicts a 3.5% increase in vehicle miles traveled (VMT) each year.
- The Silverbrook subdivision south of the site is still being built out. These trips will be included in the buildout scenarios.
- Other in-process developments identified by the County and MDT.

### Planned Transportation Improvements:

- The Montana Department of Transportation (MDT) is studying a roadway reconstruction project for Secondary Highway 292 (Whitefish Stage Road) between West Reserve Drive and Montana Highway 40 (MT-40). The purpose of the study is to determine the scope and limits of a future reconstruction project, which will provide an improved roadway that enhances mobility, safety, and long-term viability of the roadway. The Whitefish Stage Road Project would improve the road running parallel to US 93 and could have implications for the traffic volumes on US 93.
- The Kalispell Area Move 2040 Transportation Plan (2040) (Reference 4) includes two future corridor preservation projects on Church Road, one from West Valley Road to US 93 and the other from US 93 to Whitefish Stage. The Plan prioritizes these improvements as low.

## ANALYSIS TOOLS AND OPERATING STANDARDS

Kittelton will perform the intersection operational analysis as follows:

- Use the *Highway Capacity Manual (HCM)*, 6<sup>th</sup> Edition analysis procedures (Reference 5).
- Use peak 15-minute flow rate during the weekday PM and Saturday peak hours in the evaluation of all intersection level-of-service (LOS), volume-to-capacity (V/C) ratios and 95<sup>th</sup> percentile queues.
- Use Synchro 11 software to analyze signalized and stop-controlled intersections, and if needed for supplemental analysis, HCS 7 software (version 7.70) or SIDRA INTERSECTION 9.
- Use the HCM 2000 procedure for signalized intersection overall V/C ratios because the HCM 6<sup>th</sup> Edition procedure does not produce an intersection overall V/C ratio.

Flathead County does not have adopted LOS standards for signalized and unsignalized intersections. The City of Kalispell uses LOS C to be considered acceptable (Reference 4).

Guidance for roadway operations standards in the MDT Road Design Manual (Reference 6) identifies a target LOS B for level/rolling and LOS C for mountainous conditions for all principal arterials, such as US 93. The LOS B and LOS C criteria are more pertinent for freeways and two-lane highways versus the urban arterial conditions within the project area. In urban conditions, LOS D or E and a volume-to-capacity ratio of less than 1.0 are often acceptable. This guidance is consistent with MDT's Traffic Engineering Manual (Reference 7).

Given the rural context of the study area and high posted speed (65 miles per hour) of US 93, Kittelson plans to use LOS C and volume-to-capacity ratio of 0.90 for unsignalized and signalized intersections within the project area.

## Next Steps

Please contact Andy Daleiden (208.472.9804 or [adaleiden@kittelson.com](mailto:adaleiden@kittelson.com)), Md Sakoat Hossan (407.373.1157 or [shossan@kittelson.com](mailto:shossan@kittelson.com)), or Tara Hofferth (267.551.3451 or [thofferth@kittelson.com](mailto:thofferth@kittelson.com)) if you have any questions or comments on the information presented in this memorandum.

## References

1. Institute of Transportation Engineers. *Trip Generation Manual, 11<sup>th</sup> Edition*. September 2021.
2. Managing Travel for Planned Special Events. FHWA. Washington D.C. 2003.
3. Institute of Transportation Engineers. *Trip Generation Handbook 3<sup>rd</sup> Edition*. September 2017.
4. City of Kalispell. *DRAFT Kalispell Area Move 2040 Transportation Plan*. July 2021
5. Transportation Research Board. *Highway Capacity Manual 6<sup>th</sup> Edition*. Washington D.C. 2015.
6. Montana Department of Transportation. *Road Design Manual*. September 2016.
7. Montana Department of Transportation. *Traffic Engineering Manual*. November 2007.